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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/532,974	04/28/2005	Tadao Nakaya	NFA-0211	9131
74384 7590 03/17/2008 Cheng Law Group, PLLC 1100 17th Street, N.W. Suite 503 Washington, DC 20036				
EXAMINER				
NELSON, MICHAEL E				
ART UNIT		PAPER NUMBER		
1794				
MAIL DATE		DELIVERY MODE		
03/17/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/532,974

**Applicant(s)**

NAKAYA ET AL.

**Examiner**

MICHAEL E. NELSON

**Art Unit**

1794

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 3, 4 and 6 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 3, 4 and 6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/ICE)  
Paper No(s)/Mail Date 04/28/2005, 07/25/2005
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_

## DETAILED ACTION

### *Claim Objections*

1. Claim 1, 3 and 4 are objected to because of the following informalities:
2. Claim 1 has been amended to remove material, and instead redefine formula 1 where A is  $-O-Ar^1$ , where in  $Ar^1$  is a group represented by formula (6), and n denotes an integer from 1 to 4. Since the limitation for substituent B has been deleted, and repeated later in the claim. Subsequent descriptive language for substituent B in formula 1 is unnecessary and should be removed.
3. Examiner recommends the following to replace the 8 lines after formula (1):
4. "wherein Ar is a group represented by one of formulas (2)-(5); A is  $-O-Ar^1$ , wherein  $Ar^1$  is a group represented by formula (6), and n denotes an integer from 1 to 4."
5. Claims 3 and 4 are both independent claims, but refer back to substituent definitions in claim 1. The claims should be corrected to include separate substituent definitions for each independent claim.
6. Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

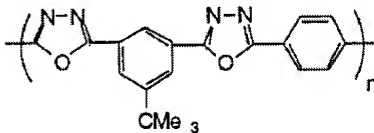
A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Art Unit: 1794

8. Claim 4 is rejected under 35 U.S.C. 102(b) as being anticipated by Holmes et al. (WO 96/020253).

9. Concerning claim 4, Holmes et al. describes the polymer material with the structure shown below, along with a method for forming the polymer material. (page 38, example 18-21). The polymer meets the limitations of claim 4 where B one B is a hydrogen atom, and one B is Y-R, where Y is a single bond, and R is alkyl (specifically t-butyl)



### ***Claim Rejections - 35 USC § 103***

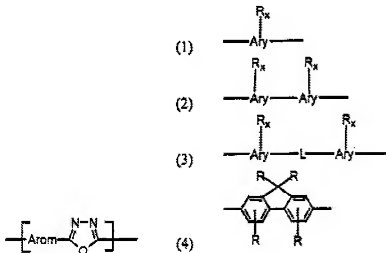
10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

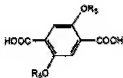
11. Claims 1 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al. (WO 01/77203).

Art Unit: 1794

12. Concerning claim 1, Wang et al. describe conjugated polymers for use in electroluminescent devices having the general structure shown below, where Arom is selected from (1), (2), (3), or (4) shown below. The substituent R includes alkyl, wherein none, or one or more  $-\text{CH}_2-$  units are replaced by a moiety selected from  $-\text{O}-$ ,  $-\text{S}-$ ,  $\text{C}_{2-14}$  aryl and  $-\text{NR}'-$ . (page 4, lines 8-13) Therefore Wang et al. describes the  $-\text{O}-\text{Ar}^1$  substituent of claim 1, as an alkyl where the first  $-\text{CH}_2-$  is replaced by  $-\text{O}-$ , the second is unchanged, and the third is replaced by  $\text{C}_6$  aryl.



13. By way of example, Wang et al. describes the polymer formed from the monomer shown below, where  $\text{R}_5$  and  $\text{R}_6$  include straight-chain alkyl, where one or more of the  $-\text{CH}_2-$  groups may be replaced by another group selected from  $-\text{O}-$ ,  $-\text{S}-$ ,  $-\text{NR}'-$ , and  $\text{C}_{2-14}$  aryl. (Page 11, lines 25-31) Therefore, Wang et al. further describes the benzyloxy substituent, where the first  $-\text{CH}_2-$  unit of the alkoxy substituent is unchanged, and the second  $-\text{CH}_2-$  unit is replaced by  $\text{C}_6$  aryl, and the benzyloxy substituent would therefore be predicted to function in the same manner as the alkoxy substituent

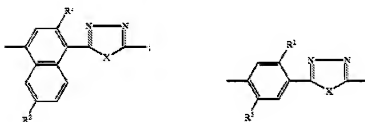


14. The polymer described by the above formula meets the limitations of Claim 1, where in A is  $-O-Ar^1$ , where  $Ar^1$  is benzyl, n is 2,  $R^1$  is alkyl, and  $R^1_n$  (n is 1), Ar is illustrated by Applicant's formula (4) where B is  $Y-Ar^1$ , where  $Ar^1$  is described above, and Y is  $-O-$ , and Bn (n is 2)
15. Concerning claim 6, Wang et al. describe the polymer material discussed above, and describe their photoluminescence (example 20, page 32-33), and the use of the polymers described in electroluminescent devices comprising a pair of electrodes and a film of the luminescent polymer. (See example 21, page 6, lines 9-11).
16. Wang et al. are silent on the synthesis of the specific polymer discussed above, but describe synthetic methods for producing the oxadiazole copolymers from the di-acid compound shown above, and hydrazine hydrochloride. (Examples 17 and 18, pages 30-31).
17. Given the teaching described above, and the fact that the benzyloxy substituent would be predicted to function in the same manner as the alkoxy substituent, combined with the synthetic methodology described by Wang et al., it would have been obvious to one of ordinary skill in the art to synthesize the polymer described above, and to use the polymer in an electroluminescent device, and predict that it would function in the same manner.

Art Unit: 1794

18. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Janietz et al. (WO 00/14144) (Based on English Language Equivalent US 6,476,184) in view of Wang et al. (WO 01/77203).

19. Concerning claim 3, Janietz et al. describes polymer materials for use in optical devices comprising poly 1,3,4-heterodiazoles, including oxadiazole containing polymers. As general structures, Janietz et al. teach the following partial structures, where  $R^1$  and  $R^2$  are alkyl, alkoxy, phenyl, or phenoxy, and X is S, O or N-phenyl. (abstract)



20. Janietz et al. are silent on copolymers comprising both phenylene and naphthylenyl moieties in the polymer. Janietz et al. describe the synthesis of the polymer from a dihydrazide and a di-acyl chloride, (column 9, lines 45-50) readily suitable to the formation of mixed copolymers.

21. Wang et al. describe copolymers of oxadiazole containing polymers for electroluminescent devices, and describe methods of producing copolymers from diacids and hydrazine hydrochloride.

22. Given the combined teaching, it would have been obvious to one of ordinary skill in the art to synthesize having both of the partial structures shown above, since the resulting copolymer would be predicted to function in the same manner. In regards to the substitution points on the rings, the position of substitution would not be predicted to affect the function of the polymer material as a luminescent material or as a charge

Art Unit: 1794

transporting material. Therefore it would likewise have been obvious to one of ordinary skill in the art to vary the points of substitution on the ring, since the resulting polymer would be predicted to function in the same way as a luminescent material and charge transporting material.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL E. NELSON whose telephone number is (571)270-3453. The examiner can normally be reached on M-F 7:30am-5:00pm EST (First Friday Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Callie Shosho can be reached on 571-272-1123. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Art Unit: 1794

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Michael E. Nelson  
Examiner  
Art Unit 1794

/Callie E. Shosho/  
Supervisory Patent Examiner, Art Unit 1794